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<120> MAPKs AS MODIFIERS OF THE RAC, AXIN, AND BETA-CATENIN PATHWAYS  
AND METHODS OF USE

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Glu Glu Gly Glu Gly Gly Pro Ala Glu Gly Ser Arg Asp Thr Pro Gly  
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Gly Arg Ser Asp Gly Asp Thr Asp Ser Val Ser Thr Met Val Val His  
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Asp Val Glu Glu Ile Thr Gly Thr Gln Pro Pro Tyr Gly Gly Gly Thr  
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Met Val Val Gln Arg Thr Pro Glu Glu Glu Arg Asn Leu Leu His Ala  
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Asp Ser Asn Gly Tyr Thr Asn Leu Pro Asp Val Val Gln Pro Ser His  
865 870 875 880

Ser Pro Thr Glu Asn Ser Lys Gly Gln Ser Pro Pro Ser Lys Asp Gly  
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Ser Gly Asp Tyr Gln Ser Arg Gly Leu Val Lys Ala Pro Gly Lys Ser  
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Ser Phe Thr Met Phe Val Asp Leu Gly Ile Tyr Gln Pro Gly Gly Ser  
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Gly Asp Ser Ile Pro Ile Thr Ala Leu Val Gly Gly Glu Gly Thr Arg  
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Leu Asp Gln Leu Gln Tyr Asp Val Arg Lys Gly Ser Val Val Asn Val  
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Asn Pro Thr Asn Thr Arg Ala His Ser Glu Thr Pro Glu Ile Arg Lys  
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Tyr Lys Lys Arg Phe Asn Ser Glu Ile Leu Cys Ala Ala Leu Trp Gly  
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Val Asn Leu Leu Val Gly Thr Glu Asn Gly Leu Met Leu Leu Asp Arg  
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Ser Gly Gln Gly Lys Val Tyr Gly Leu Ile Gly Arg Arg Arg Phe  
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Gln Gln Met Asp Val Leu Glu Gly Leu Asn Leu Leu Ile Thr Ile  
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Ser Gly Lys Arg Asn Lys Leu Arg Val Tyr Tyr Leu Ser Trp Leu  
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Arg Asn Lys Ile Leu His Asn Asp Pro Glu Val Glu Lys Lys Gln  
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Gly Trp Thr Thr Val Gly Asp Met Glu Gly Cys Gly His Tyr Arg  
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Val Val Lys Tyr Glu Arg Ile Lys Phe Leu Val Ile Ala Leu Lys  
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Ser Ser Val Glu Val Tyr Ala Trp Ala Pro Lys Pro Tyr His Lys  
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Phe Met Ala Phe Lys Ser Phe Ala Asp Leu Pro His Arg Pro Leu  
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Leu Val Asp Leu Thr Val Glu Glu Gly Gln Arg Leu Lys Val Ile  
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Tyr Gly Ser Ser Ala Gly Phe His Ala Val Asp Val Asp Ser Gly  
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Asn Ser Tyr Asp Ile Tyr Ile Pro Val His Ile Gln Ser Gln Ile  
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Thr Pro His Ala Ile Ile Phe Leu Pro Asn Thr Asp Gly Met Glu  
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Met Leu Leu Cys Tyr Glu Asp Glu Gly Val Tyr Val Asn Thr Tyr  
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Gly Arg Ile Ile Lys Asp Val Val Leu Gln Trp Gly Glu Met Pro  
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Thr Ser Val Ala Tyr Ile Cys Ser Asn Gln Ile Met Gly Trp Gly  
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Glu Lys Ala Ile Glu Ile Arg Ser Val Glu Thr Gly His Leu Asp

1235

1240

1245

Gly Val Phe Met His Lys Arg Ala Gln Arg Leu Lys Phe Leu Cys  
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Glu Arg Asn Asp Lys Val Phe Phe Ala Ser Val Arg Ser Gly Gly  
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Asn Trp  
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Ala Phe Thr Ala Val Lys Val Met Asn Ala Arg Lys Thr Pro Leu Pro  
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Glu Ile Gly Arg Arg Val Arg Val Asn Lys Tyr Gln Lys Ser Val Gly  
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Trp Arg Tyr Ser Asp Glu Glu Glu Asp Leu Arg Thr Glu Leu Asn Leu  
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Leu Arg Lys Tyr Ser Phe His Lys Asn Ile Val Ser Phe Tyr Gly Ala  
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Phe Phe Lys Leu Ser Pro Pro Gly Gln Arg His Gln Leu Trp Met Val  
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Met Glu Leu Cys Ala Ala Gly Ser Val Thr Asp Val Val Arg Met Thr  
 130 135 140

Ser Asn Gln Ser Leu Lys Glu Asp Trp Ile Ala Tyr Ile Cys Arg Glu  
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Pro Gln Val Gln Ala Leu Gln Gln Leu Gln Gly Ala Ala Arg Val Phe  
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Met Pro Leu Gln Ala Leu Asp Ser Ala Pro Lys Pro Leu Lys Gly Gln  
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Ile Lys Ala Pro Pro Arg Leu Arg Arg Ala Ala Arg Val Leu Met Pro  
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Leu Gln Ala Gln Val Arg Ala Pro Arg Leu Leu Gln Val Gln Ser Gln  
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Val Ser Lys Lys Gln Gln Ala Gln Thr Gln Thr Ser Glu Pro Gln Asp  
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Leu Asp Gln Val Pro Glu Glu Phe Gln Gly Gln Asp Gln Val Pro Glu  
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Gln Gln Arg Gln Gly Gln Ala Pro Glu Gln Gln Gln Arg His Asn Gln  
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Val Pro Glu Gln Glu Leu Glu Gln Asn Gln Ala Pro Glu Gln Pro Glu  
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Val Gln Glu Gln Ala Ala Glu Pro Ala Gln Ala Glu Thr Glu Ala Glu  
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Glu Pro Glu Ser Leu Arg Val Asn Ala Gln Val Phe Leu Pro Leu Leu  
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Ser Gln Asp His His Val Leu Leu Pro Leu His Leu Asp Thr Gln Val  
 595 600 605

Leu Ile Pro Val Glu Gly Gln Thr Glu Gly Ser Pro Gln Ala Gln Ala  
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Trp Thr Leu Glu Pro Pro Gln Ala Ile Gly Ser Val Gln Ala Leu Ile  
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Glu Gly Leu Ser Arg Asp Leu Leu Arg Ala Pro Asn Ser Asn Asn Ser  
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Lys Pro Leu Gly Pro Leu Gln Thr Leu Met Glu Asn Leu Ser Ser Asn  
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Arg Phe Tyr Ser Gln Pro Glu Gln Ala Arg Glu Lys Lys Ser Lys Val  
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Gln His Glu Glu Glu Leu Arg Gln Val Asp Lys Asp Lys Glu Asp Glu  
740 745 750

Ser Ser Asp Asn Asp Glu Val Phe His Ser Ile Gln Ala Glu Val Gln  
755 760 765

Ile Glu Pro Leu Lys Pro Tyr Ile Ser Asn Pro Lys Lys Ile Glu Val  
770 775 780

Gln Glu Arg Ser Pro Ser Val Pro Asn Asn Gln Asp His Ala His His  
785 790 795 800

Val Lys Phe Ser Ser Ser Val Pro Gln Arg Ser Leu Leu Glu Gln Ala  
805 810 815

Gln Lys Pro Ile Asp Ile Arg Gln Arg Ser Ser Gln Asn Arg Gln Asn  
820 825 830

Trp Leu Ala Ala Ser Glu Ser Ser Ser Glu Glu Glu Ser Pro Val Thr  
835 840 845

Gly Arg Arg Ser Gln Ser Ser Pro Pro Tyr Ser Thr Ile Asp Gln Lys  
850 855 860

Leu Leu Val Asp Ile His Val Pro Asp Gly Phe Lys Val Gly Lys Ile  
865 870 875 880

Ser Pro Pro Val Tyr Leu Thr Asn Glu Trp Val Gly Tyr Asn Ala Leu  
885 890 895

Ser Glu Ile Phe Arg Asn Asp Trp Leu Thr Pro Ala Pro Val Ile Gln  
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Pro Pro Glu Glu Asp Gly Asp Tyr Val Glu Leu Tyr Asp Ala Ser Ala  
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Gln Ala Asn Asp Val Cys Lys Asp His Asp Asp Asp Asn Asn Lys Phe  
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Val Asp Asp Val Asn Asn Asn Tyr Tyr Glu Ala Pro Ser Cys Pro Arg  
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Ala Ser Tyr Gly Arg Asp Gly Ser Cys Lys Gln Asp Gly Tyr Asp Gly  
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Phe Glu Tyr Leu Gln Glu Glu Pro Gly Gly Gly Asn Glu Ala Ser  
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Ser Asp Asn Lys Asp Ile Ser Glu Ser Ser Thr Gln Ser Asp Phe  
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Ser Ala Asn His Ser Ser Pro Ser Lys Gly Ser Gly Met Ser Ala  
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|      |     |      |     |      |     |
|------|-----|------|-----|------|-----|
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| Asp  | Ala | Asn  | Phe | Ala  | Ser |
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| Ile  | Leu | Tyr  | Ala | Gly  | Phe |
| Val  | Val | Glu  |     |      |     |
| 1175 |     | 1180 |     | 1185 |     |
| Gln  | Pro | Ser  | Glu | Val  | Asn |
| 1190 |     | 1195 |     | 1200 |     |
| Cys  | Lys | Lys  | Pro | Leu  | Ile |
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| Ser  | Leu | Trp  |     |      |     |
| 1220 |     | 1225 |     | 1230 |     |
| Thr  | Arg | Ser  | Asn | Leu  | Tyr |
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| Arg  | Arg | Arg  |     |      |     |
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| Leu  | Glu | Pro  | Leu | Asn  | Leu |
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| His  | Leu | Thr  |     |      |     |
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| Pro  | Glu | Glu  | Ala | Cys  | Lys |
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| Ala  | Ile |      |     |      |     |
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| Val  | Gln | His  | Glu |      |     |
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| Ser  | Ile | His  | Leu |      |     |
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| Thr  | Ala | Ile  | Lys |      |     |
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| Tyr  | Met | Ser  |     |      |     |
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| Ala  | Ala | Asp  |     |      |     |

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Gln Asn Ile Ile Ile Leu Pro Asp Cys Leu Gly Ile Gly Met Met  
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Arg Ser Leu Gln Ser Arg Val Leu Glu Ser Glu Leu Lys Arg Arg Ser  
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Ile Lys Lys Leu Arg Phe Leu Cys Thr Arg Gly Asp Lys Leu Phe Phe  
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Thr Ser Thr Leu Arg Asn His His Ser Arg Val Tyr Phe Met Thr Leu  
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Gly Lys Leu Glu Glu Leu Gln Ser Asn Tyr Asp Val  
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